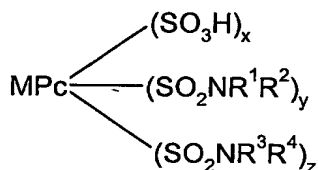


Claims

1. A process for forming an image on a substrate comprising applying an ink thereto by means of an ink-jet printer wherein the ink comprises a liquid medium and a phthalocyanine dye fraction obtainable by the fractionation of a solution and/or suspension of a mixture of phthalocyanine dyes of Formula (1), and salts thereof, by cross-flow filtration:



Formula (1)

wherein:

M is 2H, copper or nickel;

Pc represents a phthalocyanine nucleus;

R<sup>1</sup> and R<sup>3</sup> independently are H or optionally substituted C<sub>1-4</sub>alkyl;

R<sup>2</sup> and R<sup>4</sup> independently are H or optionally substituted hydrocarbyl; or

R<sup>1</sup> and R<sup>2</sup>, and, R<sup>3</sup> and R<sup>4</sup>, independently, together with the nitrogen atom to which they are attached represent an optionally substituted aliphatic or aromatic ring system;

x is 0 to 3.9;

y is 0 to 3.9;

z is 0.1 to 4; and

the sum of (x+y+z) is 2.4 to 4.5.

2. A process according to claim 1 wherein the substrate is paper.

3. A process according to either claim 1 or claim 2 wherein the substrate is photographic quality paper.

4. A process according to any one of the preceding claims wherein the ink has a viscosity of less than 20cP at 25°C; contains less than 500ppm in total of divalent and trivalent metal ions (other than any divalent and trivalent metal ions bound to a component of the ink); contains less than 500ppm halide ions; and has been filtered through a filter having a mean pore size below 10µm.

5. A process according to any one of the preceding claims where in the mixture of phthalocyanine dyes of Formula (1) M is Cu.

5 6. A process according to any one of the preceding claims where in the mixture of phthalocyanine dyes of Formula (1) R<sup>1</sup>, R<sup>2</sup>, and R<sup>3</sup> are all H and R<sup>4</sup> is hydroxyethyl.

7. A process according to any one of the preceding claims where in the mixture of phthalocyanine dyes of Formula (1) R<sup>3</sup> is H, R<sup>4</sup> is carboxyphenyl and y is 0.

10 8. A process according to any one of the preceding claims where in the mixture of phthalocyanine dyes of Formula (1) R<sup>3</sup> and R<sup>4</sup> are both H and y is 0.

15 9. A process according to any one of the preceding claims wherein the cross-flow filtration membrane is an ultrafiltration membrane.

10. A process according to claim 9 wherein the ultrafiltration membrane has a nominal molecular weight cut-off in the range of from 5,000 to 500,000.

20 11. A process according to either claim 9 or claim 10 wherein the ultrafiltration membrane has a nominal molecular weight cut-off in the range of from 20,000 to 100,000.

12. A process according to any one of the preceding claims wherein cross-flow filtration is through a series of 2 or more membranes.

25 13. A printed substrate obtainable by means of a process as described in any one of claims 1 to 12.

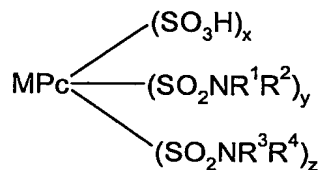
14. A printed substrate according to claim 13 which comprises paper.

30 15. A printed substrate according to either claim 13 or claim 14 which is a photographic quality print.

16. An ink-jet printing ink that comprises:

35 i) a phthalocyanine dye fraction obtainable by the fractionation of a solution and/or suspension of a mixture of phthalocyanine dyes of Formula (1) and salts thereof by cross-flow filtration :

17



Formula (1)

wherein:

- 5           M       is 2H, copper or nickel;  
           Pc       represents a phthalocyanine nucleus;  
           R<sup>1</sup> and R<sup>3</sup> independently are H or optionally substituted C<sub>1-4</sub>alkyl;  
           R<sup>2</sup> and R<sup>4</sup> independently are H or optionally substituted hydrocarbyl; or  
           R<sup>1</sup> and R<sup>2</sup>, and, R<sup>3</sup> and R<sup>4</sup>, independently, together with the nitrogen atom to which  
 10           they are attached represent an optionally substituted aliphatic or aromatic ring  
           system;  
           x is 0 to 3.9;  
           y is 0 to 3.9;  
           z is 0.1 to 4; and  
 15           the sum of (x+y+z) is 4; and

(ii) a liquid medium:

- 20           wherein the ink has a viscosity of less than 20cP at 25°C; contains less than  
           500ppm in total of divalent and trivalent metal ions (other than any divalent and trivalent  
           metal ions bound to a component of the ink); contains less than 500ppm halide ions; and  
           has been filtered through a filter having a mean pore size below 10μm.

- 25           17.    An ink-jet printer cartridge comprising a chamber and an ink wherein the ink is in  
           the chamber and the ink is as defined in claim 16.